Amendment to the Claims:

This listing of the claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

Claim 1 (Currently amended). A method of reconstructing images from data provided by at least one detector, comprising the steps of:

rotating a scanner in at least one ~~a single~~ curve within a plane about a stationary object while scanning the object;

scanning the object along a line transversal to the plane of said at least one curve ~~with the scanner~~;

storing at least 1 cone beam (CB) projection in memory at a time;

using at least one family of lines for the step of reconstructing;

applying a convolution based shift invariant Filtered Back Projection (FBP) algorithm to both the at least one curve within the plane and the line transversal to the plane of the at least one curve; and

back projection updating the image of the scanned object to reconstruct ~~reconstructing~~ an exact image of the scanned object with the a convolution based FBP ~~(Filtered Back Projection)~~ algorithm.;

~~storing at least 1 cone beam (CB) projection in memory at a time; and~~

~~using one family of lines for the step of reconstructing.~~

Claim 2 (Original). The method of claim 1, wherein the single curve includes the step of:

rotating a C-arm device about a portion of the object.

Claim 3 (Original). The method of claim 1, wherein the single curve includes the step of:

rotating a gantry about a portion of the object

Claim 4 (Original). The method of claim 1, wherein the single curve includes the step of:

rotating between approximately 5 degrees up to approximately 360 degrees.

Claim 5 (Original). The method of claim 4, further comprising the step of:

rotating over approximately 360 degrees about the object.

Claim 6 (Original). The method of claim 1, wherein the rotating and the subsequently scanning the object include the steps of:

moving a table supporting the object through a C-arm device and rotating the C-arm around the object.

Claim 7 (Canceled).

Claim 8 (Previously presented). The method of claim 1, wherein the step of storing at least 1 cone beam (CB) projection includes the steps of:

storing approximately 2 to approximately 4 cone beam (CB) projections in memory at a time.

Claim 9 (Canceled).

Claim 10 (Original). A method of reconstructing images from a planar curve scan and a line scan of an object, comprising the steps of:

(a) collecting cone beam (CB) data from a detector during the planar curve scan and the line scan of the object;

(b) identifying lines on a plane Π intersecting the cone beam, wherein the step (b) of identifying lines includes the steps of:

(bi) if the x-ray source belongs to the line scan, project the planar curve scan onto Π and choose a discrete set of lines tangent to that projection;

(bii) if the x-ray source belongs to the planar curve scan, project the planar curve scan onto Π and choose a discrete set of lines parallel to that projection;

(c) preprocessing and shift invariant filtering said data along said lines, wherein the step (c) of preprocessing includes computing the derivative $(\partial/\partial s)D_f(y(s),\Theta)$, wherein

s is parameter along the scan path, which determines point $y(s)$ on the said path,

$D_f(y,\Theta)$ is the cone beam transform of f corresponding to the x-ray source located at the point y and the direction Θ,

f is a function describing the object being scanned;

(d) back projecting said filtered data to form a precursor of said image; and

(e) repeating steps a, b, c, and d until an image of the object is reconstructed.

Claim 11 (Original). The method of claim 10, wherein shift-invariant filtering in step (c) includes convolving the derivative $(\partial/\partial s)D_f(y(s),\Theta)$ with kernel $1/\sin(\gamma)$ within a filtering plane containing $y(s)$ and a line, identified in step (b) above, where γ is polar angle in the plane.

Claim 12 (Original). The method of claim 10, wherein the planar curve scan includes:

a complete circle about the object.

Claim 13 (Original). The method of claim 10, wherein the planar curve scan includes:

less than complete circle about the object.

Claim 14 (Original). The method of claim 10, wherein the back-projection step (d) includes the steps of:

(di) fix a reconstruction point x, which represents a point inside the object being scanned, to reconstruct the image;

(dii) If s belongs to $I(x)$, then the said filtered CB data affects the image at x and one performs Steps (diii) to (dvii). If s is not inside the interval $I(x)$, then the said

filtered CB data is not used for the image reconstruction at x and go back to step (di) and choose another reconstruction point, here

$I(x)$ is the parametric interval corresponding to the section of the scan path bounded by the PI-line of x;

PI-line of x is the line segment containing x, one endpoint of which belongs to the planar curve scan, and the other endpoint of which belongs to the line scan;

(diii) find the projection $\hat{x}$ of x onto a detector plane $DP(s)$ and unit vector $\beta(s,x)$, which points from $y(s)$ towards x;

(div) estimate a value of $\Phi(s,\beta(s,x))$, where $\Phi(s,\beta(s,x))$ is the filtered CB data corresponding to the source position located at the point $y(s)$ and direction $\beta(s,x)$;

(dv) determine contribution from filtered CB data to the image being reconstructed at the point x by multiplying $\Phi(s,\beta(s,x))$ by a weighting factor;

(dvi) add the said contribution to the image being reconstructed at the point x according to a pre-selected scheme; and

(dvii) go to step (di) and choose a different reconstruction point x.

Claim 15 (Original). The method of claim 10, further comprising the steps of:

storing approximately 2 to approximately 4 cone beam (CB) projections in memory at a time; and

using one family of lines for each x-ray source position for the step of filtering.

Claim 16 (Original). A method of computing images derived from a planar curve scan and a line scan, comprising the steps of:

(a) collecting cone beam (CB) data from a detector during a planar curve scan and line scan of an object;

(b) identifying lines on a plane Π intersecting the cone beam, wherein the step (b) of identifying lines includes the steps of:

(bi) if the x-ray source belongs to the line portion of the scan, project the planar curve portion of the scan onto Π and choose a set of lines tangent to that projection;

(bii) if the x-ray source belongs to the planar curve portion of the scan, project the planar curve portion of the scan onto Π and choose a set of lines parallel to that projection;

(c) preprocessing and shift invariant filtering said data along said lines, wherein the step (c) of preprocessing includes computing the derivative of $D_f(y(s),\Theta)$ with respect to Θ along a direction non-parallel to the plane determined by $y(s)$ and a filtering line, the said plane being a filtering plane, here

s is parameter along the scan path, which determines point $y(s)$ on the said path,

$D_f(y,\Theta)$ is the cone beam transform of f corresponding to the x-ray source located at the point y and the direction Θ,

f is a function describing the object being scanned;

(d) back projecting said filtered data to form a precursor of said image; and

(e) repeating steps a, b, c, and d until an image of the object is reconstructed.

Claim 17 (Original). The method of claim 16, wherein shift-invariant filtering in step (c) includes convolving the data $D_f(y(s),\Theta)$ with kernel $1/\sin(\gamma)$ within a filtering plane, where γ is polar angle in the plane.

Claim 18 (Original). The method of claim 16, wherein shift-invariant filtering in step (c) includes convolving the data $D_f(y(s),\Theta)$ with kernel $\frac{\partial}{\partial\gamma}\frac{1}{\sin(\gamma)}$ within a filtering plane, where γ is polar angle in the plane.

Claim 19 (Original). The method of claim 16, wherein shift-invariant filtering in step (c) includes convolving the derivative of $D_f(y(s),\Theta)$ with a kernel within a filtering plane, the derivative of $D_f(y(s),\Theta)$ is the derivative with respect to Θ along a direction non-parallel to the filtering plane.

Claim 20 (Original). The method of claim 19, wherein $y(s)$ belongs to the line portion of the scan.

Claim 21 (Original). The method of claim 19, wherein $y(s)$ belongs to the planar curve portion of the scan.

Claim 22 (Original). The method of claim 16, wherein the planar curve scan includes:

a complete circle about the object.

Claim 23 (Original). The method of claim 16, wherein the planar curve scan includes: less than complete circle about the object.

Claim 24 (Original). The method of claim 16, wherein the back-projection step (d) includes the steps of:

(di) fix a reconstruction point x, which represents a point inside the object being scanned, to reconstruct the image;

(dii) If s belongs to $I(x)$, then the said filtered CB data affects the image at x and one performs Steps (diii) to (dvii). If s is not inside the interval $I(x)$, then the said filtered CB data is not used for the image reconstruction at x and go back to step (di) and choose another reconstruction point, wherein

$I(x)$ the parametric interval corresponding to the section of the scan path bounded by the PI-line of x;

PI-line of x is the line segment containing x, one endpoint of which belongs to the planar curve scan, and the other endpoint of which belongs to the line scan;

(diii) find the projection $\hat{x}$ of x onto a detector plane $DP(s)$ and unit vector $\beta(s,x)$, which points from $y(s)$ towards x;

(div) estimate a value of $\Phi(s,\beta(s,x))$, where $\Phi(s,\beta(s,x))$ is the filtered CB data corresponding to the source position located at the point $y(s)$ and direction $\beta(s,x)$;

(dv) determine contribution from filtered CB data to the image being reconstructed at the point x by multiplying $\Phi(s,\beta(s,x))$ by a weighting factor;

(dvi) add the said contribution to the image being reconstructed at the point x according to a pre-selected scheme; and

(dvii) go to step (di) and choose a different reconstruction point x.

Claim 25 (Original). The method of claim 16, further comprising the steps of:

storing 1 cone beam(CB) projection in memory at a time; and

using one family of lines for each x-ray source position for the step of filtering.

Claim 26 (Currently amended). A method of reconstructing images from data provided by at least one detector, comprising the steps of:

scanning the object with a planar curved scan and a line scan by at least one detector; ~~and~~

storing at least one cone beam (CB) projection in memory at a time;

applying a convolution based shift invariant Filtered Back Projection (FBP) algorithm to both the planar curved scan and the line scan; and

back projection updating the image of the scanned object to reconstruct an exact image of the scanned object with the convolution based shift invariant FBP algorithm using at least one family of lines.

~~reconstructing an exact image of the scanned object with a convolution based FBP (Filtered Back Projection) algorithm.~~

Claim 27 (Original). The method of claim 26, wherein the scanning step includes the step of:

scanning by the planar curved scan before the line scan.

Claim 28 (Original). The method of claim 26, wherein the scanning step includes the step of:

scanning by the line scan before the planar curved scan.

Claim 29 (Original). The method of claim 26, further comprising the step of:

providing a C-arm device for the scanning of the object.

Claim 30 (Original). The method of claim 26, further comprising the step of:

providing a gantry for the scanning of the object.

Claim 31 (Original). The method of claim 26, wherein the planar curve scan includes:

at least a full circle scan about the object.

Claim 32 (Original). The method of claim 26, wherein the planar curve scan includes:

less than a full circle scan about the object.

Claim 33 (Previously presented). The method of claim 26, further comprising the step of:

consecutively scanning the object with another planar curve scan and another line scan.

Claim 34 (New). A method of computing images derived from a planar curve scan and a line scan, comprising the steps of:

using at least one family of lines for the step of reconstructing;

applying a convolution based shift invariant Filtered Back Projection (FBP) algorithm to both the planar curved scan and the line scan;

backprojection updating the image of the scanned object to reconstruct an image of the scanned object with the convolution based shift invariant FBP algorithm, wherein the step of backprojection includes:

(a) fixing a reconstruction point x;

(b) identifying a line segment containing the point x, whose one endpoint $y_C(x)$ is on the curve scan, and the other endpoint $y_L(x)$ is on the line scan;

(c) for image reconstruction at x use that portion of the line scan cone beam data, which is on one side of $y_L(x)$, and very limited amount of the line scan cone beam data, which is on the other side of $y_L(x)$; and

(d) repeating steps a, b, and c for all points x, where image reconstruction is desired.